IN THE CLAIMS

1. (withdrawn) A digital subscriber line transmission method for transmitting downstream data from a device on an office side to a device on a subscriber side and upstream data from the device on the subscriber side to the device on the office side over a single line by switching between these data transmissions in time-division fashion, dividing data of one symbol, modulating carrier waves having different frequencies by each item of divided data and frequency-multiplexing the modulated signals, and transmitting the frequency-multiplexed signals a few symbols at a time, said method comprising the steps of:

generating a training symbol sequence, which comprises a plurality of successive symbols, in bursts on a training-symbol transmitting side at time of training carried out prior to data communication;

adding some data that is contained within the training symbol sequence onto at least one of the beginning and the end of this symbol sequence; and

transmitting the training symbol sequence onto which some of the data has been added to a training-symbol receiving side.

2. (withdrawn) A digital subscriber line transmission method for transmitting downstream data from a device on an office side to a device on a subscriber side and upstream data from the device on the subscriber side to the device on the office side over a single line by switching between these data transmissions in time-division fashion, dividing data of one symbol, modulating carrier waves having different frequencies by each item of divided data and

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frequency-multiplexing the modulated signals, and transmitting the frequency-multiplexed

signals a few symbols at a time, said method comprising the steps of:

generating a training symbol sequence, which comprises a plurality of successive

symbols, in bursts on a training-symbol transmitting side at time of training carried out prior to

data communication;

adding some data that is contained within the training symbol sequence onto at least one

of the beginning and the end of this symbol sequence;

transmitting the training symbol sequence onto which some of the data has been added to

a training-symbol receiving side; and

removing the data, which has been added onto the training symbol sequence, on the

receiving side.

3. (withdrawn) The method according to claim 1, wherein length of a training symbol

sequence after data has been added thereon at the time of training and of a transmit symbol

sequence at time of normal communication is set in such a manner that the symbol sequence will

not fall within an interval in which effects of near-end crosstalk from a neighboring line are

received.

4. (withdrawn) A digital subscriber line transmission method for transmitting

downstream data from a device on an office side to a device on a subscriber side and upstream

data from the device on the subscriber side to the device on the office side over a single line by

switching between these data transmissions in time-division fashion, dividing data of one

symbol, modulating carrier waves having different frequencies by each item of divided data and

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frequency-multiplexing the modulated signals, and transmitting the frequency-multiplexed

signals in bursts a few symbols at a time, said method comprising the steps of:

generating a pilot-tone signal with which synchronously processing is executed;

generating the pilot-tone signal with which synchronously processing is executed;

making the length of an interval in which a signal is not being transmitted between

contiguous transmit burst symbol sequences a whole-number multiple of the cycle of the pilot-

tone signal; and

assuring continuity of sample data in contiguous transmit burst symbol sequences by

executing processing in sync with the pilot-tone signal.

5. (withdrawn) A digital subscriber line transmission method for transmitting

downstream data from a device on an office side to a device on a subscriber side and upstream

data from the device on the subscriber side to the device on the office side over a single line by

switching between these data transmissions in time-division fashion, dividing data of one

symbol, modulating carrier waves having different frequencies by each item of divided data and

frequency-multiplexing the modulated signals, and transmitting the frequency-multiplexed

signals a few symbols at a time with a cyclic prefix attached onto each symbol, said method

comprising the steps of:

generating a pilot-tone signal with which synchronously processing is executed;

making a phase difference between phase of a training symbol and phase of a transmit

symbol from which a cyclic prefix has been removed at time of normal communication a whole-

number multiple of a pilot-tone cycle; and

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executing training processing and processing for normal data communication in sync

with the pilot-tone signal.

6. (withdrawn) A digital subscriber line transmission apparatus for transmitting

downstream data from a device on an office side to a device on a subscriber side and upstream

data from the device on the subscriber side to the device on the office side over a single line by

switching between these data transmissions in time-division fashion, dividing data of one

symbol, modulating carrier waves having different frequencies by each item of divided data and

frequency-multiplexing the modulated signals, and transmitting the frequency-multiplexed

signals a few symbols at a time, said apparatus comprising:

a training symbol generating unit for generating a training symbol sequence, which

comprises a plurality of successive symbols, in bursts at time of training carried out prior to data

communication;

a redundancy data add-on unit for adding some data that is contained within the training

symbol sequence onto at least one of the beginning and end of this symbol sequence as

redundancy data; and

a transmitting unit for transmitting the training symbol sequence onto which the

redundancy data has been added to a training-symbol receiving side.

7. (withdrawn) A digital subscriber line transmission apparatus for transmitting

downstream data from a device on an office side to a device on a subscriber side and upstream

data from the device on the subscriber side to the device on the office side over a single line by

switching between these data transmissions in time-division fashion, dividing data of one

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symbol, modulating carrier waves having different frequencies by each item of divided data and frequency-multiplexing the modulated signals, and transmitting the frequency-multiplexed signals a few symbols at a time, said apparatus comprising:

a training symbol generating unit for generating a training symbol sequence, which comprises a plurality of successive symbols, in bursts at time of training carried out prior to data communication;

a redundancy data add-on unit for adding some data that is contained within the training symbol sequence onto at least one of the beginning and end of this symbol sequence as redundancy data;

a transmitting unit for transmitting the training symbol sequence onto which the redundancy data has been added to a training-symbol receiving side;

a receiving unit for receiving the training symbol sequence onto which the redundancy data has been added;

a redundancy-data removal unit for removing the redundancy data that has been added onto the training symbol sequence; and

a training processor for executing processing based upon a training symbol from which the redundancy data has been removed.

8. (withdrawn) The apparatus according to claim 6, further comprising means for setting length of a training symbol sequence after the redundancy data has been added thereon at the time of training and of a transmit symbol sequence at time of normal communication is set in such a manner that the symbol sequence will not fall within an interval in which effects of near-end crosstalk from a neighboring line are received.

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9. (withdrawn) A digital subscriber line transmission apparatus for transmitting downstream data from a device on an office side to a device on a subscriber side and upstream data from the device on the subscriber side to the device on the office side over a single line by switching between these data transmissions in time-division fashion, dividing data of one symbol, modulating carrier waves having different frequencies by each item of divided data and frequency-multiplexing the modulated signals, and transmitting the frequency-multiplexed signals in bursts a few symbols at a time, said apparatus comprising:

a pilot-tone signal generator for generating a pilot-tone signal with which synchronously processing is executed;

means for making the length of an interval in which a signal is not being transmitted between contiguous transmit burst symbol sequences a whole-number multiple of the cycle of the pilot-tone signal; and

means for executing processing in sync with the pilot-tone signal and assuring continuity of sample data in contiguous transmit burst symbol sequences.

10. (withdrawn) A digital subscriber line transmission apparatus for transmitting downstream data from a device on an office side to a device on a subscriber side and upstream data from the device on the subscriber side to the device on the office side over a single line by switching between these data transmissions in time-division fashion, dividing data of one symbol, modulating carrier waves having different frequencies by each item of divided data and frequency-multiplexing the modulated signals, and transmitting the frequency-multiplexed

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signals a few symbols at a time with a cyclic prefix attached onto each symbol, said apparatus

comprising:

a pilot-tone signal generator for generating a pilot-tone signal with which synchronously

processing is executed;

means for making a phase difference between phase of a training symbol and phase of a

transmit symbol from which a cyclic prefix has been removed at time of normal communication

a whole-number multiple of a pilot-tone cycle; and

means for executing training processing and processing for normal data communication

in sync with the pilot-tone signal.

11. (withdrawn) A digital subscriber line transmission apparatus for transmitting

downstream data from a device on an office side to a device on a subscriber side and upstream

data from the device on the subscriber side to the device on the office side over a single line by

switching between these data transmissions in time-division fashion, dividing data of one

symbol, modulating carrier waves having different frequencies by each item of divided data and

frequency-multiplexing the modulated signals, and transmitting the frequency-multiplexed

signals a few symbols at a time, said apparatus comprising:

a training-symbol transmitting unit for receiving a training symbol via said line;

said training-symbol transmitting unit including:

a training-symbol generating unit for generating a training symbol sequence comprising a

plurality of successive symbols;

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a redundancy data add-on unit for adding some data that is contained within the training symbol sequence onto at least one of the beginning and end of this symbol sequence as redundancy data; and

a transmitting unit for transmitting the training symbol sequence onto which the redundancy data has been added to the training-symbol receiving unit; and

said training-symbol receiving unit includes:

a receiving unit for receiving the training symbol sequence onto which the redundancy data has been added;

a redundancy-data removal unit for removing the redundancy data that has been added onto the training symbol sequence; and

a training processor for executing processing based upon a training symbol from which the redundancy data has been removed.

12. (withdrawn) The system according to claim 11, wherein said line and another line on which transmission of downstream data and transmission of upstream data are performed in time-division fashion are accommodated in a cable which connects said training-symbol transmitting unit and said training-symbol receiving unit; and

said training-symbol transmitting unit has means for setting length of a training symbol sequence after redundancy data has been added thereon and of a transmit symbol sequence at time of normal communication in such a manner that the symbol sequence will not fall within an interval in which effects of near-end crosstalk from said other line are received.

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13. (previously presented) A digital subscriber line transmission method for transmitting downstream data from a device on an office side to a device on a subscriber side and upstream data from the device on the subscriber side to the device on the office side over a single line by switching between these data transmissions in time-division fashion, dividing data of one symbol, modulating carrier waves having different frequencies by each item of divided data and frequency-multiplexing the modulated signals, and transmitting the frequency-multiplexed signals in bursts a few symbols at a time, said method comprising the steps of:

incorporating timing information, which specifies an interval in which effects of crosstalk from a neighboring line are received, in a training symbol sequence at time of training carried out prior to data communication; and

transmitting the training symbol sequence in which the timing information is incorporated from the device in the office side to the device on the subscriber side wherein the subscriber side determines a transmit interval for the upstream data and a receive interval for the downstream data based on the timing information,

wherein the timing information is incorporated in the training symbol sequence by changing the phase between adjacent training symbols by the device on the office side and a phase-change point in the training symbol sequence is detected by the device on the subscriber side and a timing which is a set time before or a set time after the phase-change detection time is adopted as the start timing of said interval.

14. - 15. (canceled)

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16. (previously presented) The method according to claim 13, wherein the phase of adjacent symbols constructing a training symbol sequence is varied by 90° or 180°.

17. (previously presented) The method according to claim 13, wherein a carrier wave of a predetermined frequency is quadrature modulated and the phase between adjacent symbols obtained by quadrature modulation is varied.

18. (currently amended) A digital subscriber line transmission apparatus in a digital subscriber line transmission system for transmitting downstream data from a device on an office side to a device on a subscriber side and upstream data from the device on the subscriber side to the device on the office side over a single line by switching between these data transmissions in time-division fashion, dividing data of one symbol, modulating carrier waves having different frequencies by each item of divided data and frequency-multiplexing the modulated signals, and transmitting the frequency-multiplexed signals in bursts a few symbols at a time, said apparatus comprising:

a timing-information insertion unit to insert timing information, which specifies an interval in which effects of crosstalk from a neighboring line are received, into a training symbol sequence at time of training carried out prior to data communication; and

a transmitting unit to transmit the training symbol sequence, into which the timing information has been inserted, from the device on the office side to the device on the subscriber side wherein the subscriber side determines a transmit interval for the upstream data and a receive interval for the downstream data based on the timing information,

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wherein said timing-information insertion unit inserts the timing information into the

training symbol sequence by changing the phase between adjacent training symbols and the

device on the subscriber side detects a phase-change point in the training symbol sequence and